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Fig. 3.

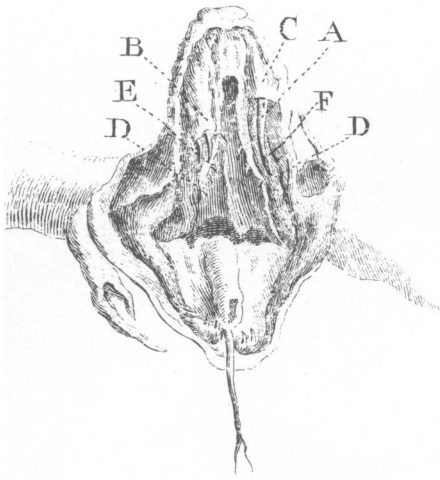


Fig. 1.

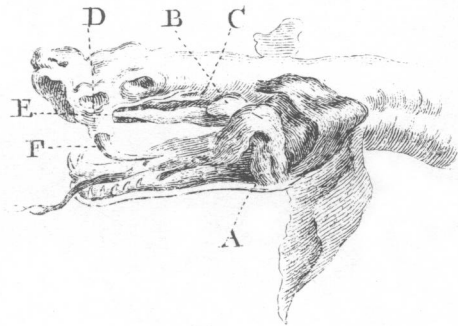


Fig. 2.

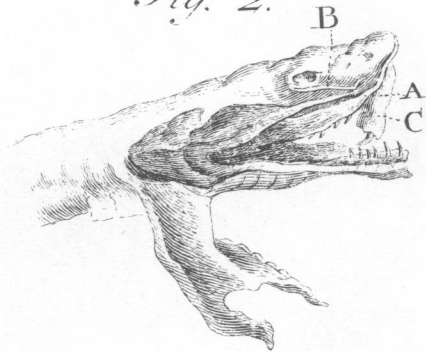
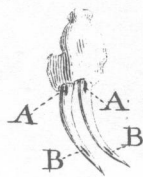


Fig. 4.



I. *The Anatomy of the Poisonous Apparatus of a Rattle-Snake, made by the Direction of Sir Hans Sloane, Bart. Præf. Soc. Reg. & Coll. Med. Together with an Account of the quick Effects of its Poison ; by John Ranby, Esq; Surgeon to his Majesty's Household, and F. R. S.*

**T**HIS Animal was sent from *Virginia* to an eminent Merchant, and having been by him presented to Sir *Hans Sloane*, it was plac'd in my Hands, on Purpose to make such Experiments with it as might inform Mankind of the fatal Symptoms which attend its Bite, and the Appearances in the dead Bodies of such Animals as have been bit by it. It is only by this Method, and a Number of Facts faithfully stated and compared with each other, that we may hope one Time or other to discover the Manner of the Poison's operating, and perhaps (a thing of the utmost Consequence) to find out some Remedies, internal or external, to relieve Persons bit by it. The Anatomy of the Rattle-Snake having been so accurately described by the late ingenious Dr. *Tyson*, very little more can be added to his Account ; I shall therefore only take Notice of the *Instruments* of its Poison, some of which are different from what that celebrated Anatomist observ'd. Removing then the common Integuments

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ments of the Head, the *Muscles* that raise the poisonous Fangs appear; the first of which arises with a short fleshy Beginning from the upper Edge of the lower Jaw, near the Articulation of one of those Bones which Dr. *Tyson* calls *Maxillarum Dilatores* (See *Fig. 1. A.*) and sends a few carnos Fibres to the Side of the *Cranium*; then becomes tendinous, and so marches to its Insertion in the Outside of the Bone which receives the poisonous Fang. (See *Fig. 2.*) Displacing this Muscle there appeared a *Gland*, (See *Fig. 1. B.*) about the Bigness of a small Pea, which I take to be one of the *Maxillary Glands*, for the following Reasons: *First*, The Structure of the Parts and its Distance from the Fang make it unlikely to be design'd for separating the *poisonous Fluid*, but rather a *Saliva* to moisten the Aliment, in order to make it pass down the *Oesophagus* with Ease, the Stomach of those Animals being but small, and the Gullet considerably larger; not without some Analogy to the *Ingluvies* or Crop of Granivorous Fowls, where the Food stops for some time and is moistened, before it is capable of descending into the Stomach. *Secondly*, These Parts are so contrived, that on opening the Mouth to receive the Prey (at which Time such a Fluid is most wanted) the Muscle above mentioned pressing on the Gland promotes the Discharge of its Contents into the Mouth. The *Duct* of this Gland seems to open between the Upper Lip and the Jaw, but as the excretory Ducts of so small a Gland are rarely to be seen with Certainty, I won't pretend exactly to determine its Aperture. Under this Gland lies another *Muscle* smaller than the former, which arises and is inserted near it (See *Fig. 1. C.*) these two Muscles draw the Bone (*Fig. 1. D.*) in which

which the poisonous Fang is fix'd a little outwards and upwards. Between the last described Muscle and Gland passes a *Nerve* to the upper Part of the Bone which receives the Tooth (*Fig. 1. E.* and *Fig. 2. B.*) and it is probable that this *Nerve* has been taken for the *excretory Duct* of the Gland before mention'd. Opening the Mouth, two small *Eminencies* appear in the Fore-part on the Inside of the upper Jaw, being a *Membrane*, raised by the Fangs and drawn over them like the Mouth of a Purse (*Fig. 3. A. B.* *Fig. 2. C.*) This *Membrane* is thick and strong, and placed in a Microscope, appears to have a Number of Glands, some of which are even visible to the naked Eye. In a common Viper I observed one on each Side the Fang. These *Membranes* prevent the involuntary Discharge of the Poison out of the Fangs (which in my Opinion are the *only Repositories* of that Fluid) into the Mouth, as also the killing with the Fangs little Animals on which they sometimes feed. Putting back this *Membrane*, the *fatal Fangs* appear, which on first View seem'd to be only *one* on each Side, till searching further there appeared *four* more; the first and largest is fix'd in a *Bone*, which Bone is articulated to the fore Part of the upper Jaw (*Fig. 1. F.*) The four others are fastened in and covered with strong tendinous *Membranes*, and lie as it were one over another (*Fig. 2. B.* *Fig. 3. C.* and *E.*) These Teeth are crooked and bent in this Form), especially the first, and have each *two Perforations*, the one on the upper Part, the other at the lower Part of its convex Side; which last comes quite to the Point, and resembles the sloping Cut of a Pen. The upper Perforation (*Fig. 4. A.*) I imagine receives the Poison, the other transmits it into the Wound (*Fig. 4. B.*) All these Fangs are *tubular*, the

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largest

largest of which contained a small Quantity of a *transparent Fluid* of a light yellowish Colour, which on putting the Snake into Spirit of Wine changed to a beautiful Red (the Fangs of the common Vipers I have examined had the lower Perforation nearer the Middle) Freeing the Mouth of the Membrane, a *Muscle* appears about the Size of the first described above, which arises from the Middle of the *Maxillarum Dilatores* (Fig. 3. D.D.) and is inserted on the under Side of the largest Tooth, for the Force required to pull down the Fang being less than to raise it, fewer Muscles are required. This Animal was in my Custody about a Month, during which Time he bit three Dogs, and a Cat; the two first were bit at the *College of Physicians*, and of these the first died about two Minutes after the Bite, and the Moment he was bit he grew convulsed, and lost the Use of his Limbs. The Wounds were exceedingly small, and between the pectoral Muscles. Upon opening the Dog, the Skin and *Membrana Adiposa* for the Breadth of a Crown were livid about the Wound, as if from a violent Blow. The second Dog bit at the *College* had the same Symptoms with the first, but liv'd near a Quarter of an Hour, and had bloody Stools. Three Days after, I carried the Snake to bite another Dog and Cat. The Dog was larger than either of the two former, and having been bit at the Extremity of the Nose he was immediately affected, howled, shook, fell down and foamed at the Mouth; and in about ten Minutes discharged his Excrements involuntarily, tinged with Blood: He died in about two Hours. The next Day I opened the Body and observ'd the *Abdominal* Contents very much inflamed, especially the Stomach and Intestines, which appeared nearly equal to the

the finest Injection; opening the Stomach and Intestines they contained a mucous Matter, the greatest Part of which was Blood, and the fine *villous* Coat which is so visible in these Animals was entirely destroyed. About an Hour before he was bit he had a plentiful Meal of coarse Beef, of which there was not the least Appearance. Opening the *Thorax*, the *Pleura* and other Membranes looked as if injected; the Heart was turgid with Blood, as were also its Vessels. The Vessels of the Membranes of the Brain made a most beautiful Figure from the Quantity of Blood contained in them, as did likewise the Blood-Vessels of the Nerves; there was a small Quantity of Water between the two Hemispheres. The Blood contained in the Heart and its Vessels was an even Mass about the Consistence of Cream. The Cat had upon opening nearly the same Appearances, and lived about five Hours.

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II. *A Letter from the Rev. Dr. Samuel Clarke to Mr. Benjamin Hoadly, F. R. S. occasion'd by the present Controversy among Mathematicians, concerning the Proportion of Velocity and Force in Bodies in Motion.*

S I R,

IT has often been observed *in general*, that *Learning* does not give Men *Understanding*; and that the absurdest Things in the World have been asserted and maintained, by Persons whose Education and Studies